

Assessing and Developing Critical Thinking Skills

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Workshop Goals:

- Clarify Desired Critical Thinking Outcomes
- Discover How Cognitive Development Affects Critical Thinking Performance
- Use Cognitive Patterns to Assess Critical Thinking Skills Demonstrated in Student Essays
- Use Assessment Results to Identify Student Learning Opportunities
- Take Home Tools for Your Own Implementation

Desired Learning Outcomes: Critical Thinking Skills

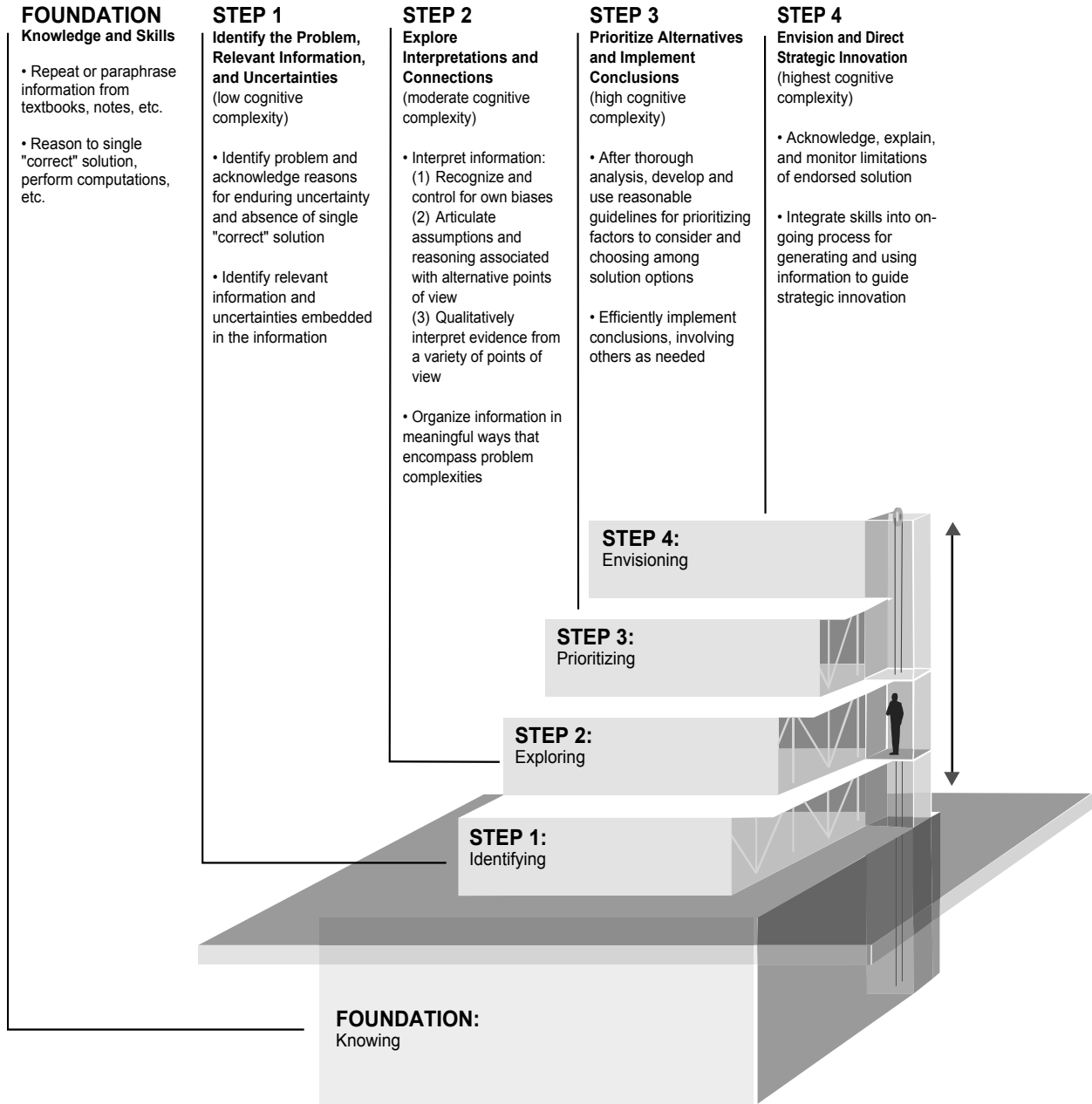
ACTIVITY

List Words/Phrases That Describe Desired Critical Thinking Skills:



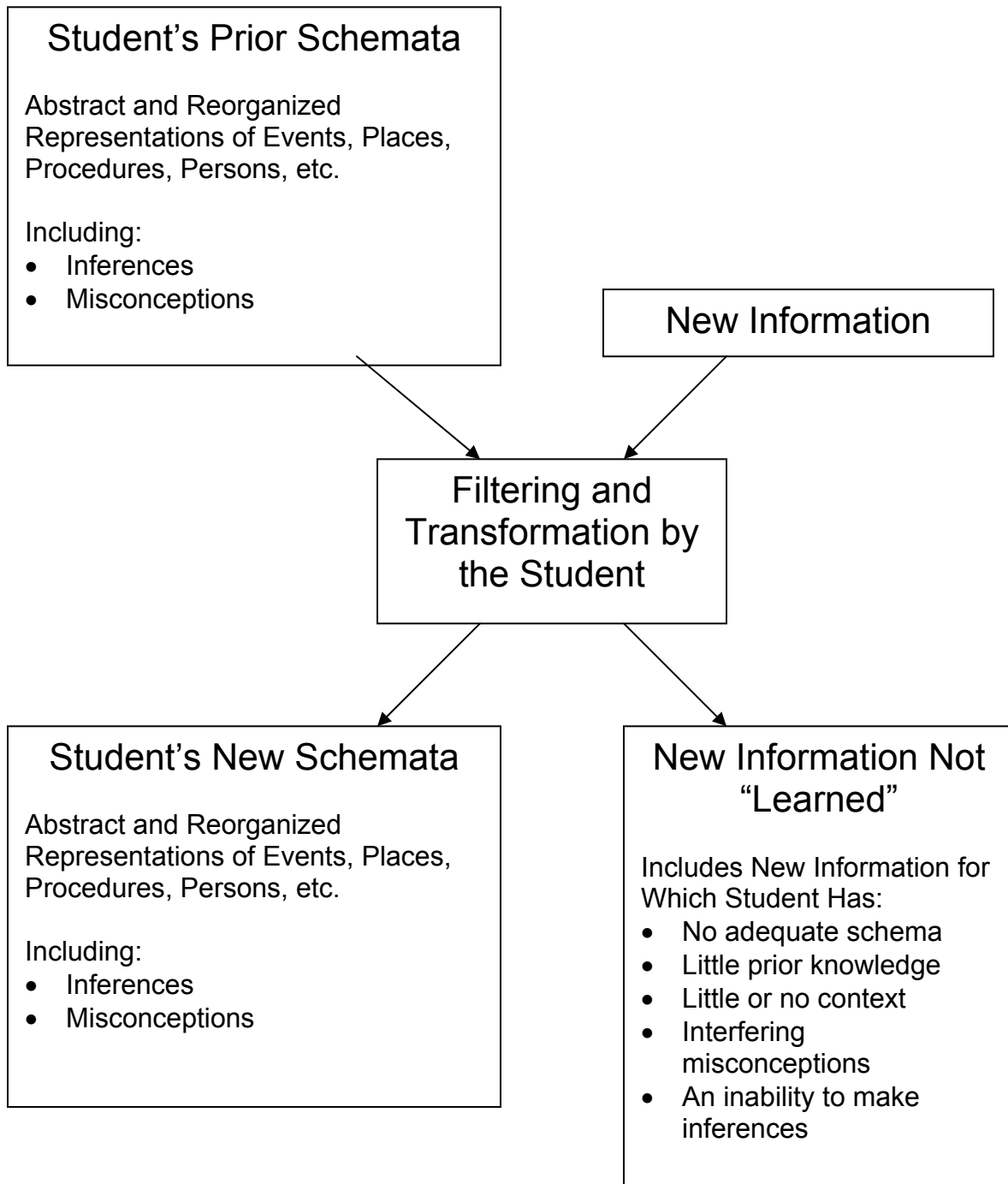
STEPS FOR BETTER THINKING

A Developmental Problem Solving Process



© 2002, Cindy L. Lynch, Susan K. Wolcott, and Gregory E Huber. Permission is granted to reproduce this information for noncommercial purposes. Please cite this source: Lynch, C. L., Wolcott, S. K., & Huber, G. E. (May 31, 2002). Steps for Better Thinking: A Developmental Problem Solving Process [On-line]. Available: <http://www.WolcottLynch.com>. Model evolved from ideas presented in King and Kitchener's (1994) reflective judgment model of cognitive development and Fischer's (Fischer & Bidell, 1998) dynamic skill theory.

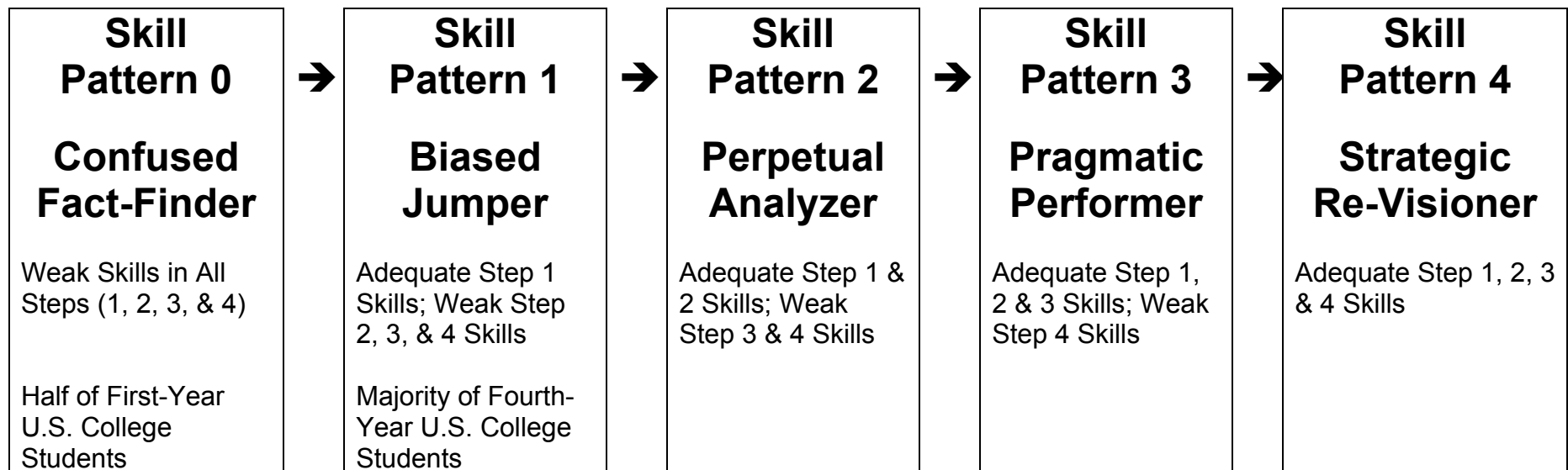
Overview of Schema Theory



To learn more, see: Cross, K. Patricia and Mimi Harris Steadman, 1996, *Classroom Research: Implementing the Scholarship of Teaching*, San Francisco: Jossey-Bass Publishers, pp. 36-56.

Overview: Steps for Better Thinking Performance Patterns

Skills Develop in Sequential Stages:



Do You Recognize These Students?

Performance Pattern 0: Confused Fact-Finder

- Looks for the “only” answer
- Doesn’t seem to “get it”
- Quotes inappropriately from textbooks
- Provides illogical/contradictory arguments
- Appears unable to read carefully
- Insists professors, the textbook, or other experts provide the “correct” answer, even to open-ended problems

Approx. 50% of U.S. First-Year College Students in Unsupported Settings

Classroom Vignettes: The Confused Fact-Finder (Performance Pattern 0)

Professor Bergen was reflecting on her last finance class session. Part of the session involved identifying and discussing possible reasons why some companies pay dividends while other companies do not. Several of the students seemed to be completely off the mark—they kept referring to “good” or “bad” managers instead of identifying possible reasons, such as differences in free cash flows, that might cause differences in companies’ dividend policies.

Professor Ramakrishnan was grading his world history examination. One question required students to describe the pros and cons of U.S. involvement in the Gulf war. Instead of describing pros and cons, several students simply described the war.

Transition →		
Performance Pattern 0 Confused Fact-Finder	Major Improvements: <ul style="list-style-type: none">• Acknowledges existence of continuing uncertainty• Recognizes viability of multiple perspectives• Begins to use evidence logically to support conclusions	Performance Pattern 1 Biased Jumper

Performance Pattern 1: Biased Jumper

- Jumps to conclusions
- Does not recognize own biases; Accuses others of being biased
- Stacks up evidence for own position; Ignores contradictory evidence
 - Uses arguments for own position
 - Uses arguments against other positions
- Equates unsupported personal opinion with other forms of evidence
- Acknowledges multiple viewpoints, but cannot adequately address a problem from viewpoint other than own

Majority of U.S. College Seniors in Unsupported Settings

Classroom Vignettes: The Biased Jumper (Performance Pattern 1)

Professor Ramakrishnan was grading his world history examination. One question required students to describe the pros and cons of U.S. involvement in the Gulf war. Instead of describing pros and cons, several students provided only the pros OR the cons of U.S. involvement in the Gulf war, but not both.

Two of Professor McDonald's students were very angry about the grades on their Psychology paper. One confronted the professor and argued, "I don't understand how I could get a C—I did the work!" The other angry student complained on the teaching evaluation, "The professor was very biased in her grading."

Transition →		
Performance Pattern 1 Biased Jumper	Major Improvements: <ul style="list-style-type: none">• Attempts to control own biases• Identifies issues, assumptions, and biases associated with multiple perspectives• Logically and qualitatively evaluates evidence from different viewpoints• Organizes information meaningfully	Performance Pattern 2 Perpetual Analyzer

Performance Pattern 2: Perpetual Analyzer

- Doesn't reach or adequately defend a solution
- Exhibits strong analysis skills, but appears to be "wishy-washy"
- Writes papers that are too long and seem to ramble
- Doesn't want to stop analyzing:
 - "I can look at it this way, and I can look at it that way, and..."
 - "Wait! What about _____?"

Classroom Vignette: The Perpetual Analyzer (Performance Pattern 2)

Professor Vaughn was very excited as she read this student's paper. "At last," she thought, "I'm reading a paper by a student who knows how to analyze." By the end of the paper, however, she had become disappointed. The student's recommendation, required in the assignment, was very weak. After presenting the relevant information and analyses, the paper seemed to "fizzle."

Transition →		
Performance Pattern 2 Perpetual Analyzer	Major Improvements: <ul style="list-style-type: none">• Avoids getting “hung up” by consciously prioritizing issues and information• Maintains objectivity, but articulates well-founded support for choosing one solution	Performance Pattern 3 Pragmatic Performer

Performance Pattern 3: Pragmatic Performer

- Objectively considers alternatives before reaching conclusions
- Focuses on pragmatic solutions
- Incorporates others in the decision process and/or implementation
- Views task as finished when a solution/decision is reached
- Gives insufficient attention to limitations, changing conditions, and strategic issues
- Sometimes comes across as a “Biased Jumper,” but reveals more complex thinking when prompted

Classroom Vignette: The Pragmatic Performer (Performance Pattern 3)

Professors Wu and Kessler were sharing some of their recent experiences in teaching the business strategies course. “I’m sure that some of these students can think more strategically than they demonstrate in the case papers they write for my class!” Professor Wu exclaimed. “But they just don’t seem to take the time to think past making the most obvious recommendation. Maybe they’re too busy interviewing for jobs this semester.”

Transition →		
Performance Pattern 3 Pragmatic Performer	Major Improvements: <ul style="list-style-type: none">• Prioritizes and addresses limitations effectively• Interprets and re-interprets bodies of information systematically over time• Exhibits a strategic, long-term vision• Spontaneously considers possible ways to generate new information	Performance Pattern 4 Strategic Re-Visioner

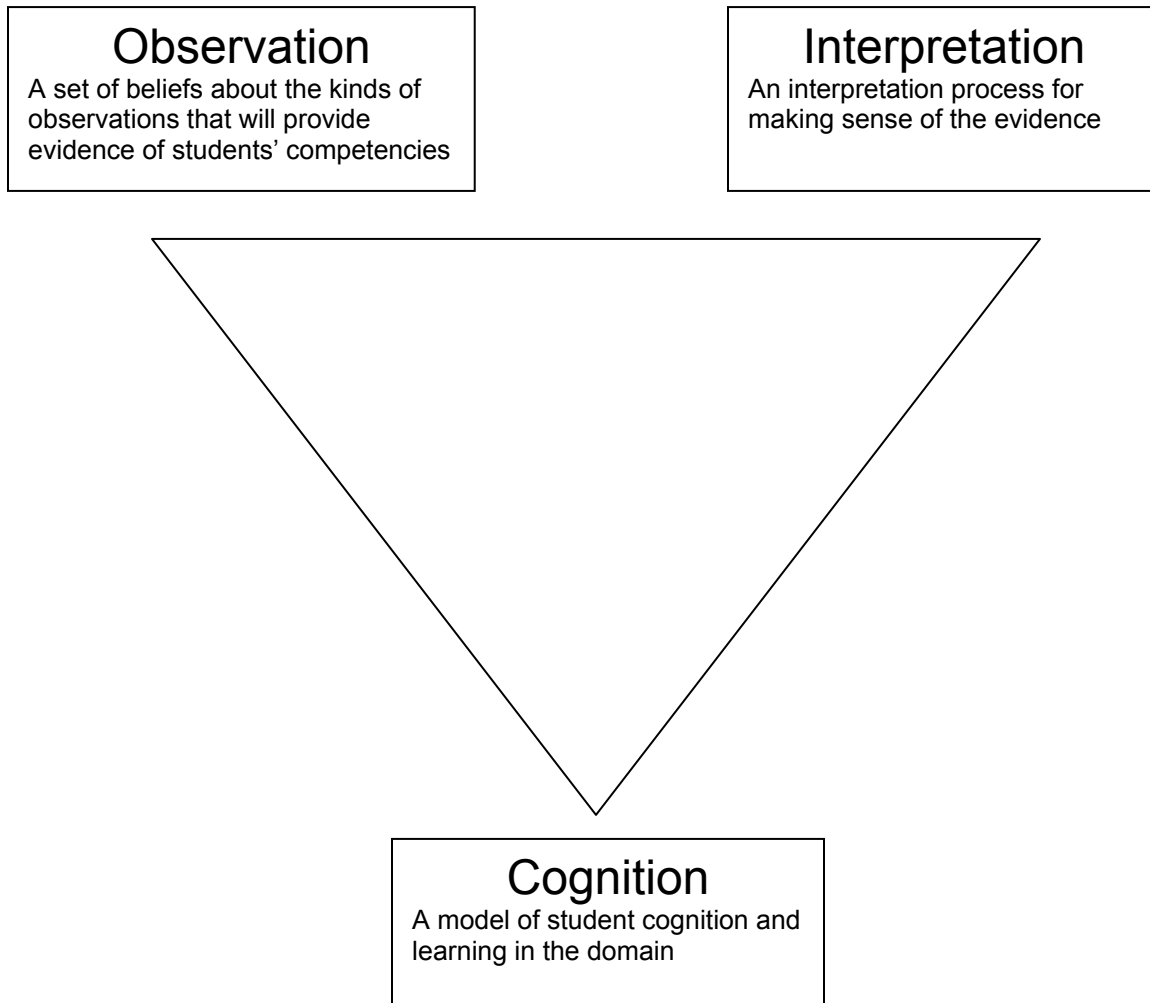
Performance Pattern 4: Strategic Re-Visioner

- Seeks continuous improvement/lifelong learning
- More likely than others to think “out of the box”
- Anticipates change
- Works toward constructing knowledge over time

Classroom Vignette: The Strategic Re-Visioner (Performance Pattern 4)

Professor Schuler had no reservation about writing a glowing letter of recommendation for this particular student. “Sandy is the rare student who not only understands engineering technical knowledge, but also performs superior analyses, recognizes and incorporates the most important issues, and always seeks to learn more,” he wrote.

Assessment Triangle



Adapted from pages 39-45 and 281 of Pellegrino, J., Chudowsky, N., and R. Glaser (eds.). (2001). *Knowing What Students Know: The Science and Design of Educational Assessment*. Report of the National Research Council, Center for Education, Division on Behavioral and Social Sciences and Education. Washington, D. C.: National Academy Press. Can be read on-line at: <http://www.nap.edu/catalog/10019.html>.

Application of the Assessment Triangle

Model of Cognition:	Steps for Better Thinking (Reflective Judgment Model and Dynamic Skill Theory)
Observation:	Student Written Responses to a Classroom Assignment
Interpretation:	Steps for Better Thinking Competency Rubric (A blank copy can be downloaded under “Educator Resources” at http://www.WolcottLynch.com .)

ACTIVITY: Identifying Performance Patterns

Read the assignment and essay responses of Students #1, #2, and #3 on the following pages.

Refer to the performance pattern descriptions in IDEA paper, Figure 2.

In small groups, reach an agreement about the performance pattern exhibited in each essay.

An assignment similar to the one below was used by Lt. Col. Donna Peterson in a required Electrical Engineering course at the U.S. Air Force Academy. Students in the course had been given reading materials about studying and had written several journal entries about their study habits prior to this assignment, which was given at the end of the course.

Study Habits Assignment

As a part of this course, you have maintained a study journal to help you reflect on your grading habits, course performance, and feelings.

As you approach the final exam in this course, **you must prepare a one to two page (single-spaced) essay on the following question:**

How effective have your study habits been in this course?

In your essay, you must address each of the following issues:

1. What, if anything, have you learned about your study habits this semester?
2. Have you made any changes this semester in how you study, take tests, or think/feel about your schoolwork?
 - If no, why not?
 - If yes, what changes have you made and why? With what results?

Study Habits Essay Response: Student #1

This semester I have learned that my study habits are good according to the books I have read. I don't know why my performance is not what it should be for a college student. I have learned that the harder I try the less pleased I am with the way things go. I find that if I don't put any effort into something then I am not disappointed when it does not turn out the way I expected.

I have made some minor changes in the way I study. I think I have done the homework more faithfully, and I have set a four-hour minimum time for studying before midterm exams. Last year I used to go to bed at eleven regardless of what was accomplished. I think these changes are good in the sense that every book I have read says that you need to study and some recommend high numbers of hours of study. I made the changes because my grades are not what they should be.

The results of these changes have been dismal. I have not passed the midterm exams with flying colors yet I seem to do fairly well on quizzes and projects except for one, which occurred during a bad week.

From books and my academic advisor, indications are that I am studying the right way and that I just need to give it time and things will work out. I feel that I am putting forth the effort needed to succeed. I don't know of too many people who can study for two hours a night each night before a midterm exam and then about four the night before and still manage to fail the midterm exam.

Study Habits Essay Response: Student #2

The purpose of the study journal, which I have been keeping for Electrical Engineering 231, has been to help me reflect on my study habits to date. Throughout various points of the semester, I have written entries pertaining to study skills. As the end draws near, I must now analyze my current study habits, and how effective they have been in this course.

I have learned a lot about my study habits this past semester. Up until entering the Academy, I never had to study, and therefore had really bad study skills and habits. Good grades just came naturally. I was always able to balance school, sports, a job, a girlfriend, family, friends, and anything else that came my way without any major conflicts. I relied on what had transcended in the past to guide me through the future. With time, I learned this would not be the case. I would have to change my study habits if I was to get off academic trouble. I now know that college is a whole different academic ball-game. I must study a lot harder than I had ever had to. Admitting I had a problem with my study habits has been the first step, a step which I have taken this past semester.

Due to my past performance, I have had to make changes this semester on how I study, take tests, and think/feel about my course-work. First off, I must devote a lot more time to my studies. I must remain caught up with my work, regardless of obstacles that may get in the way. I must set goals to achieve, and remain focused on the goals. Furthermore, I must not wait till the last minute to do that which I should have done earlier, for example completing big assignments and studying for exams. Although the progress I have made has not been immense, it has nonetheless been extremely beneficial to me. I know that if I continue making progress, I will be well on my way to becoming an academic giant.

I have learned that the best way for me to study is by doing a lot of practice through repetitions. It is not enough to know the material, it is also very important to be able to do it well and in a reasonable amount of time. Through experience, I now know that the only way to ensure that I don't run out of time on an exam is to practice, practice, practice. As the saying goes: Practice makes perfect. Aside from doing repetitious work, it is extremely important to stay caught up in order to avoid pulling all-nighters.

Study Habits Essay Response: Student #3

After reviewing the notes taken after each lesson, several conclusions concerning my study habits can be made. I almost always look at the syllabus to see what will be covered in the next lesson. I at least skim the material and make an assessment of what type of preparation will be adequate based on several criteria, and I accomplish the homework if it is feasible and necessary. An accurate assessment of my study habits cannot be established simply by reviewing the notes taken for this class. I approach studying with a cost-benefit analysis for all of my classes. After checking the syllabi and skimming the material, I make an assessment of the importance of the homework for each class based on my current grade in each class, the presence of a major graded event in one or more classes, the likelihood of getting a quiz the following day in class, and my current level of understanding of the material covered.

I really haven't made any changes in my study habits throughout the semester. I have generally met with success using the method described above and have only modified it slightly in the past two years. I am a little disappointed with my performance this semester in this particular class. Due to its concentration on problems rather than just concepts, one is required to work through a lot of problems in order to do extremely well. This is generally time consuming and loses out to other time demands.

I believe that my method of studying is appropriate in a time demanding environment like the Air Force Academy. Given an unlimited amount of time, I believe that it would be better to accomplish all assigned tasks for every lesson in every class. However, this is an impractical study technique due to time constraints inherent to the Air Force Academy. This forces students to develop less than desirable study techniques that can still get the job done.

ACTIVITY: Steps for Better Thinking Competency Rubric

Demonstration: Assessing the response of student #3

Complete a Steps for Better Thinking Competency Rubric for the response of students #1 and #2

In small groups, reach agreement on your ratings for each essay.

Procedures for Using Steps for Better Thinking Competency Rubric

1. Use one copy of the rubric for each assessment.
2. Review the performance carefully. If it is written, underline key statements made by the student that provide clues about the student's underlying thinking.
3. First consider the student's overall approach to the problem (the bottom row) and circle or highlight the closest description on the competency rubric. If you are having trouble recognizing the overall approach, refer to the Steps for Better Thinking Skill Patterns (IDEA Paper Figure 2) for additional guidance.
4. Next, identify and circle or highlight all skills exhibited by the student. You can do this in any order, but it will probably be easiest to do this row-by-row. Begin at the top of the rubric, and move from left to right. Beginning with the left-most skill in a row, determine whether or not the student's performance exhibits the skill. If so, circle/highlight the skill and continue one cell to the right. If not, skip that row and move to the next row. (If a student does not exhibit the skill in a particular cell, then the student will not exhibit the skills in any cells to the right on the same row.)
5. Sometimes a student exhibits only part of a skill. In that case, circle/highlight only the part(s) exhibited.
6. Avoid overrating student skills by giving them the "benefit of the doubt." Do not circle/highlight a skill unless the performance demonstrates it. (However, students might not explicitly discuss uncertainties. Sometimes you must infer their understanding of uncertainties based on the way they discuss and evaluate information and perspectives.)
7. Students with very weak skills might have only one skill circled/highlighted on the entire rubric—typically, "Identifies facts, definitions, and/or experts' opinions."
8. When you are finished circling/highlighting skills, determine the student's performance pattern by identifying the right-most column containing marked items. If the majority of skills in that column are circled/highlighted, then the student's rating is the performance pattern for that column. If a student's right-most skills appear to be split between two adjacent columns, then the rating is half-way between those two performance patterns (e.g., 1.5 for a rating between 1 and 2).
9. It is rare for a student's highest performance to be spread across more than two performance patterns. This type of finding usually means that there are problems with the ratings, the assessment assignment, or the quality of the student's response. You should carefully review the ratings.
10. Sometimes a student's response does not provide enough information to adequately classify the student's skills. Assess that response as "unable to rate."
11. Compare your skill rating with your initial rating from #3 above. They should agree within 0.5. If not, review and revise your ratings.

Steps for Better Thinking Competency Rubric

Student: Study Habits Assignment: Student 2A

Rater: Susan Wolcott

Possible Overall Ratings: U (Unable to rate), 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0

Overall Rating: 0.0

	Performance Pattern 0 "Confused Fact Finder"	Performance Pattern 1 "Biased Jumper"	Performance Pattern 2 "Perpetual Analyzer"	Performance Pattern 3 "Pragmatic Performer"	Performance Pattern 4 "Strategic Revisoner"	
Step 1 Skills	Identify relevant information Circle ALL that apply	Identifies facts, definitions, and/or experts' opinions.	Identifies information ¹ that is relevant to the problem	Explores a wide range of relevant information ¹	Focuses on the most important relevant information ¹	Develops viable strategies for generating important relevant information ¹ over time
	Recognize and address uncertainties ² Circle ALL that apply	Identifies at least one reason for temporary uncertainty ²	Identifies at least one reason for significant and permanent uncertainty ²	Addresses significant and permanent uncertainties ² when interpreting information	Identifies and discusses the significance of the most important uncertainties ²	Develops viable strategies for minimizing important uncertainties ² over time
Step 2 Skills	Integrate multiple perspectives ³ and clarify assumptions ⁴ Circle ALL that apply		Acknowledges more than one potential solution, approach, or viewpoint	Analyzes information from multiple perspectives, ³ including assumptions ⁴ and alternative objectives	Provides reasonable and substantive justification for assumptions ⁴ used in analysis	Argues convincingly using a complex, coherent discussion of own perspective; Articulates strengths and weaknesses of position
	Interpret and organize information Circle ALL that apply		Uses evidence logically to support a point of view; Correctly applies concepts/theories/techniques	Qualitatively interprets information and develops meaningful categories for analysis	Preserves problem complexity, but emphasizes the most important and/or most relevant and reliable information	Systematically re-interprets information as circumstances change or new information becomes available
Step 3 Skills	Use guidelines or principles to judge objectively across options Circle ALL that apply			Avoids reaching a biased conclusion	Maintains objectivity while establishing reasonable priorities for reaching a well-founded conclusion	Uses a systematic process of critical inquiry to build a solution; Articulates how problem solving approach and criteria can be refined, leading to better solutions or greater confidence over time
	Communicate and implement conclusions Circle ALL that apply				Appropriately tailors communication or implementation plans to the setting and audience	Provides appropriate information to motivate and engage others in long-term strategies
Step 4 Skills	Address solution limitations Circle ALL that apply				Focuses on most efficient ways to address limitations or to gather additional information	Articulates solution limitations as a natural part of addressing open-ended problems
	Engage in continuous improvement Circle ALL that apply					Identifies uncertainties and limitations as opportunities for continuous improvement; Engages in lifelong learning
Overall Approach to the Problem Circle ONLY ONE		Proceeds as if goal is to find the single, "correct" answer	Proceeds as if goal is to stack up evidence and information to support own conclusion	Proceeds as if goal is to establish an unbiased, balanced view of evidence and information from different points of view	Proceeds as if goal is to come to a well-founded conclusion based on objective consideration of priorities across viable alternatives	Proceeds as if goal is to strategically construct knowledge, to move toward better conclusions or greater confidence in conclusions as the problem is addressed over time

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Steps for Better Thinking Competency Rubric

Student: Study Habits Assignment: Student 2B

Rater: Susan Wolcott

Possible Overall Ratings: U (Unable to rate), 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0

Overall Rating: 1.0

	Performance Pattern 0 "Confused Fact Finder"	Performance Pattern 1 "Biased Jumper"	Performance Pattern 2 "Perpetual Analyzer"	Performance Pattern 3 "Pragmatic Performer"	Performance Pattern 4 "Strategic Revisoner"	
Step 1 Skills	Identify relevant information Circle ALL that apply	Identifies facts, definitions, and/or experts' opinions.	Identifies information ¹ that is relevant to the problem	Explores a wide range of relevant information ¹	Focuses on the most important relevant information ¹	Develops viable strategies for generating important relevant information ¹ over time
	Recognize and address uncertainties ² Circle ALL that apply	Identifies at least one reason for temporary uncertainty ²	Identifies at least one reason for significant and permanent uncertainty ²	Addresses significant and permanent uncertainties ² when interpreting information	Identifies and discusses the significance of the most important uncertainties ²	Develops viable strategies for minimizing important uncertainties ² over time
Step 2 Skills	Integrate multiple perspectives ³ and clarify assumptions ⁴ Circle ALL that apply		Acknowledges more than one potential solution, approach, or viewpoint	Analyzes information from multiple perspectives, ³ including assumptions ⁴ and alternative objectives	Provides reasonable and substantive justification for assumptions ⁴ used in analysis	Argues convincingly using a complex, coherent discussion of own perspective; Articulates strengths and weaknesses of position
	Interpret and organize information Circle ALL that apply		Uses evidence logically to support a point of view; Correctly applies concepts/theories/techniques	Qualitatively interprets information and develops meaningful categories for analysis	Preserves problem complexity, but emphasizes the most important and/or most relevant and reliable information	Systematically re-interprets information as circumstances change or new information becomes available
Step 3 Skills	Use guidelines or principles to judge objectively across options Circle ALL that apply			Avoids reaching a biased conclusion	Maintains objectivity while establishing reasonable priorities for reaching a well-founded conclusion	Uses a systematic process of critical inquiry to build a solution; Articulates how problem solving approach and criteria can be refined, leading to better solutions or greater confidence over time
	Communicate and implement conclusions Circle ALL that apply				Appropriately tailors communication or implementation plans to the setting and audience	Provides appropriate information to motivate and engage others in long-term strategies
Step 4 Skills	Address solution limitations Circle ALL that apply				Focuses on most efficient ways to address limitations or to gather additional information	Articulates solution limitations as a natural part of addressing open-ended problems
	Engage in continuous improvement Circle ALL that apply					Identifies uncertainties and limitations as opportunities for continuous improvement; Engages in lifelong learning
Overall Approach to the Problem Circle ONLY ONE		Proceeds as if goal is to find the single, "correct" answer	Proceeds as if goal is to stack up evidence and information to support own conclusion	Proceeds as if goal is to establish an unbiased, balanced view of evidence and information from different points of view	Proceeds as if goal is to come to a well-founded conclusion based on objective consideration of priorities across viable alternatives	Proceeds as if goal is to strategically construct knowledge, to move toward better conclusions or greater confidence in conclusions as the problem is addressed over time

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Steps for Better Thinking Competency Rubric

Student: Study Habits Assignment: Student 2C

Rater: Susan Wolcott

Possible Overall Ratings: U (Unable to rate), 0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0

Overall Rating: 4.0

	Performance Pattern 0 "Confused Fact Finder"	Performance Pattern 1 "Biased Jumper"	Performance Pattern 2 "Perpetual Analyzer"	Performance Pattern 3 "Pragmatic Performer"	Performance Pattern 4 "Strategic Revisoner"	
Step 1 Skills	Identify relevant information Circle ALL that apply	Identifies facts, definitions, and/or experts' opinions.	Identifies information ¹ that is relevant to the problem	Explores a wide range of relevant information ¹	Focuses on the most important relevant information ¹	Develops viable strategies for generating important relevant information ¹ over time
	Recognize and address uncertainties ² Circle ALL that apply	Identifies at least one reason for temporary uncertainty ²	Identifies at least one reason for significant and permanent uncertainty ²	Addresses significant and permanent uncertainties ² when interpreting information	Identifies and discusses the significance of the most important uncertainties ²	Develops viable strategies for minimizing important uncertainties ² over time
Step 2 Skills	Integrate multiple perspectives ³ and clarify assumptions ⁴ Circle ALL that apply		Acknowledges more than one potential solution, approach, or viewpoint	Analyzes information from multiple perspectives, ³ including assumptions ⁴ and alternative objectives	Provides reasonable and substantive justification for assumptions ⁴ used in analysis	Argues convincingly using a complex, coherent discussion of own perspective; Articulates strengths and weaknesses of position
	Interpret and organize information Circle ALL that apply		Uses evidence logically to support a point of view; Correctly applies concepts/theories/techniques	Qualitatively interprets information and develops meaningful categories for analysis	Preserves problem complexity, but emphasizes the most important and/or most relevant and reliable information	Systematically re-interprets information as circumstances change or new information becomes available
Step 3 Skills	Use guidelines or principles to judge objectively across options Circle ALL that apply			conclusion	establishing reasonable priorities for reaching a well-founded conclusion	critical inquiry to build a solution; Articulates how problem solving approach and criteria can be refined, leading to better solutions or greater confidence over time
	Communicate and implement conclusions Circle ALL that apply				Appropriately tailors communication or implementation plans to the setting and audience	Provides appropriate information to motivate and engage others in long-term strategies
Step 4 Skills	Address solution limitations Circle ALL that apply				Focuses on most efficient ways to address limitations or to gather additional information	Articulates solution limitations as a natural part of addressing open-ended problems
	Engage in continuous improvement Circle ALL that apply					Identifies uncertainties and limitations as opportunities for continuous improvement; Engages in lifelong learning
Overall Approach to the Problem Circle ONLY ONE		Proceeds as if goal is to find the single, "correct" answer	Proceeds as if goal is to stack up evidence and information to support own conclusion	Proceeds as if goal is to establish an unbiased, balanced view of evidence and information from different points of view	Proceeds as if goal is to come to a well-founded conclusion based on objective consideration of priorities across viable alternatives	Proceeds as if goal is to strategically construct knowledge, to move toward better conclusions or greater confidence in conclusions as the problem is addressed over time

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Common Assessment Difficulties

- **Good/Poor Communication Skills**
It is sometimes difficult to distinguish between students with good/poor thinking skills versus students with good/poor communication skills
- **Reasonable-Sounding Solution With Reasonable Support, But It Is Not Clear Whether the Student Objectively Considered Alternative(s)**
Student most likely lacks Step 2 skills
- **Solution is “Wishy-Washy”—Performs Analysis, But Does Not Reach or Adequately Defend a Solution**
Student most likely lacks Step 3 skills
- **Student Merely Cites Existence of Other Points of View or Asserts That There Are Multiple Solutions, But Fails to Adequately Consider Them**
Student most likely lacks Step 2 skills
- **Student Confusion About:**
 - “What the Professor Wants”
 - Appropriate Degree of Detail in Written Communication
- **Performance Spans Two Cognitive Levels**
It is common for performance to span two adjacent cognitive levels as students develop new skills

Advice for Assessment

Assessment Using a Developmentally-Designed Rubric Helps Faculty:

- Quickly gain insights about student competency strengths and weaknesses.
- Identify the “next steps” in building student competencies.
- Provide students with:
 - More appropriate feedback for student learning.
 - More consistent feedback across courses.
- Achieve high interrater reliability with other faculty members.
- Work toward common learning outcomes with other faculty members.

Getting Started With Critical Thinking Assessment:

1. Give your students a written assignment to address an OPEN-ENDED problem.
2. Consider giving students specific instructions for tasks at each developmental step (1, 2, 3, and 4). For ideas, see examples provided later in this handout.
3. Practice using a developmental rubric to assess student responses. Use the assessment rubric for giving feedback to your students.
4. After collecting and assessing a set of student responses, modify the assignment as needed to obtain better assessment information in the future.
5. Begin to make changes in your teaching aimed at weaknesses you observe in student responses.

Assessment Alternatives

	Steps for Better Thinking Competency Rubric¹	Steps for Better Thinking Rubric¹
Description	Describes incremental improvement in two major skills for each of the four steps in Steps for Better Thinking. Also describes overall problem approach for each performance pattern.	Describes performance patterns of two major skills for each of the four steps in Steps for Better Thinking.
Major Advantages	<ul style="list-style-type: none"> • Relatively easy to understand and use • Focuses on skill-building rather than on weaknesses • Provides meaningful feedback to students 	<ul style="list-style-type: none"> • Requires more training and practice • Describes finer distinctions between performance patterns, allowing for more reliable ratings
Major Disadvantages	<ul style="list-style-type: none"> • Does not provide a complete description of each performance pattern 	<ul style="list-style-type: none"> • Requires more practice and training

Recommendations:

- If you're interested primarily in assessment for classroom purposes, use the Steps for Better Thinking Competency Rubric and give it to your students as feedback. As you fill out the rubric, refer to the Steps for Better Thinking Skill Patterns to help you better understand each performance pattern.
- If you're interested in high reliability for research or program assessment, use the Steps for Better Thinking Rubric.

¹ A blank version can be downloaded under "Educator Resources" at <http://www.WolcottLynch.com>.

Steps for Better Thinking Rubric

Steps for Better Thinking ↓ SKILLS ↓	← Less Complex Performance Patterns			More Complex Performance Patterns →	
	"Confused Fact Finder" Performance Pattern 0—How performance might appear when Step 1, 2, 3, and 4 skills are weak	"Biased Jumper" Performance Pattern 1—How performance might appear when Step 1 skills are adequate, but Step 2, 3, and 4 skills are weak	"Perpetual Analyzer" Performance Pattern 2—How performance might appear when Step 1 and 2 skills are adequate, but Step 3 and 4 skills are weak	"Pragmatic Performer" Performance Pattern 3—How performance might appear when Step 1, 2, and 3 skills are adequate, but Step 4 skills are weak	"Strategic Re-Visioneer" Performance Pattern 4—How performance might appear when one has strong Step 1, 2, 3, and 4 skills
Step 1: IDENTIFY A—Identify and use relevant information B—Articulate uncertainties	A0—Uses very limited information; primarily "facts," definitions, or expert opinions B0—Either denies uncertainty OR attributes uncertainty to temporary lack of information or to own lack of knowledge	A1—Uses limited information, primarily evidence and information supporting own conclusion* B1—Identifies at least one reason for significant and enduring uncertainty*	A2—Uses a range of carefully evaluated, relevant information B2—Articulates complexities related to uncertainties and the relationships among different sources of uncertainty	A3—Uses a range of carefully evaluated, relevant information, including alternative criteria for judging among solutions B3—Exhibits complex awareness of relative importance of different sources of uncertainties	A4—Same as A3 PLUS includes viable strategies for GENERATING new information to address limitations B4—Exhibits complex awareness of ways to minimize uncertainties in coherent, on-going process of inquiry
Step 2: EXPLORE C—Integrate multiple perspectives and clarify assumptions D—Qualitatively interpret information and create a meaningful organization	C0—Portrays perspectives and information dichotomously, e.g., right/wrong, good/bad, smart/stupid D0—Does not acknowledge interpretation of information; uses contradictory or illogical arguments; lacks organization	C1—Acknowledges more than one potential solution, approach, or viewpoint; does not acknowledge own assumptions or biases D1—Interprets information superficially as either supporting or not supporting a point of view; ignores relevant information that disagrees with own position; fails to sufficiently break down the problem	C2—Interprets information from multiple viewpoints; identifies and evaluates assumptions; attempts to control own biases* D2—Objectively analyzes quality of information; Organizes information and concepts into viable framework for exploring realistic complexities of the problem*	C3—Evaluates information using general principles that allow comparisons across viewpoints; adequately justifies assumptions D3—Focuses analyses on the most important information based on reasonable assumptions about relative importance; organizes information using criteria that apply across different viewpoints and allow for qualitative comparisons	C4—Same as C3 PLUS argues convincingly using a complex, coherent discussion of own perspective, including strengths and limitations D4—Same as D3 PLUS systematically reinterprets evidence as new information is generated over time OR describes process that could be used to systematically reinterpret evidence
Step 3: PRIORITIZE E—Use guidelines or principles to judge objectively across the various options F—Implement and communicate conclusions for the setting and audience	E0—Fails to reason logically from evidence to conclusions; relies primary on unexamined prior beliefs, clichés, or an expert opinion F0—Creates illogical implementation plan; uses poor or inconsistent communication; does not appear to recognize existence of an audience	E1—Provides little evaluation of alternatives; offers partially reasoned conclusions; uses superficially understood evidence and information in support of beliefs F1—Fails to adequately address alternative viewpoints in implementation plans and communications; provides insufficient information or motivation for audience to adequately understand alternatives and complexity	E2—Uses evidence to reason logically within a given perspective, but unable to establish criteria that apply across alternatives to reach a well-founded conclusion OR unable to reach a conclusion in light of reasonable alternatives and/or uncertainties F2—Establishes overly complicated implementation plans OR delays implementation process in search of additional information; provides audience with too much information (unable to adequately prioritize)	E3—Uses well-founded, overarching guidelines or principles to objectively compare and choose among alternative solutions; provides reasonable and substantive justification for assumptions and choices in light of other options* F3—Focuses on pragmatic issues in implementation plans; provides appropriate information and motivation, prioritized for the setting and audience*	E4—Articulates how a systematic process of critical inquiry was used to build solution; identifies how analysis and criteria can be refined, leading to better solutions or greater confidence over time F4—Implementation plans address current as well as long-term issues; provides appropriate information and motivation, prioritized for the setting and audience, to engage others over time
Step 4: ENVISION G—Acknowledge and monitor solution limitations through next steps H—Overall approach to the problem	G0—Does not acknowledge significant limitations beyond temporary uncertainty; next steps articulated as finding the "right" answer (often by experts) H0—Proceeds as if goal is to find the single, "correct" answer	G1—Acknowledges at least one limitation or reason for significant and enduring uncertainty; if prompted, next steps generally address gathering more information H1—Proceeds as if goal is to stack up evidence and information to support own conclusion	G2—Articulates connections among underlying contributors to limitations; articulates next steps as gathering more information and looking at problem more complexly and/or thoroughly H2—Proceeds as if goal is to establish an unbiased, balanced view of evidence and information from different points of view	G3—Adequately describes relative importance of solution limitations when compared to other viable options; next steps pragmatic with focus on efficiently GATHERING more information to address significant limitations over time H3—Proceeds as if goal is to come to a well-founded conclusion based on objective consideration of priorities across viable alternatives	G4—Identifies limitations as in G3; as next steps, suggests viable processes for strategically GENERATING new information to aid in addressing significant limitations over time* H4—Proceeds as if goal is to strategically construct knowledge, to move toward better conclusions or greater confidence in conclusions as the problem is addressed over time*

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* Shaded cells most closely related to "stair step" model. Performance descriptions to the left of a shaded cell characterize skill weaknesses. Performance descriptions to the right of a shaded cell characterize skill strengths.

What Comes After Assessment?

Scaffolding: Helping Students Develop More Complex Critical Thinking Skills

Have students address OPEN-ENDED problems (i.e., ones having more than one reasonable solution)

Provide reasonable challenges

Remember: Development is sequential (Step 1, Step 2...)

In general: Target one level higher than students' existing skills

For most students, it is critical to focus on uncertainties—reasons why problems are open-ended

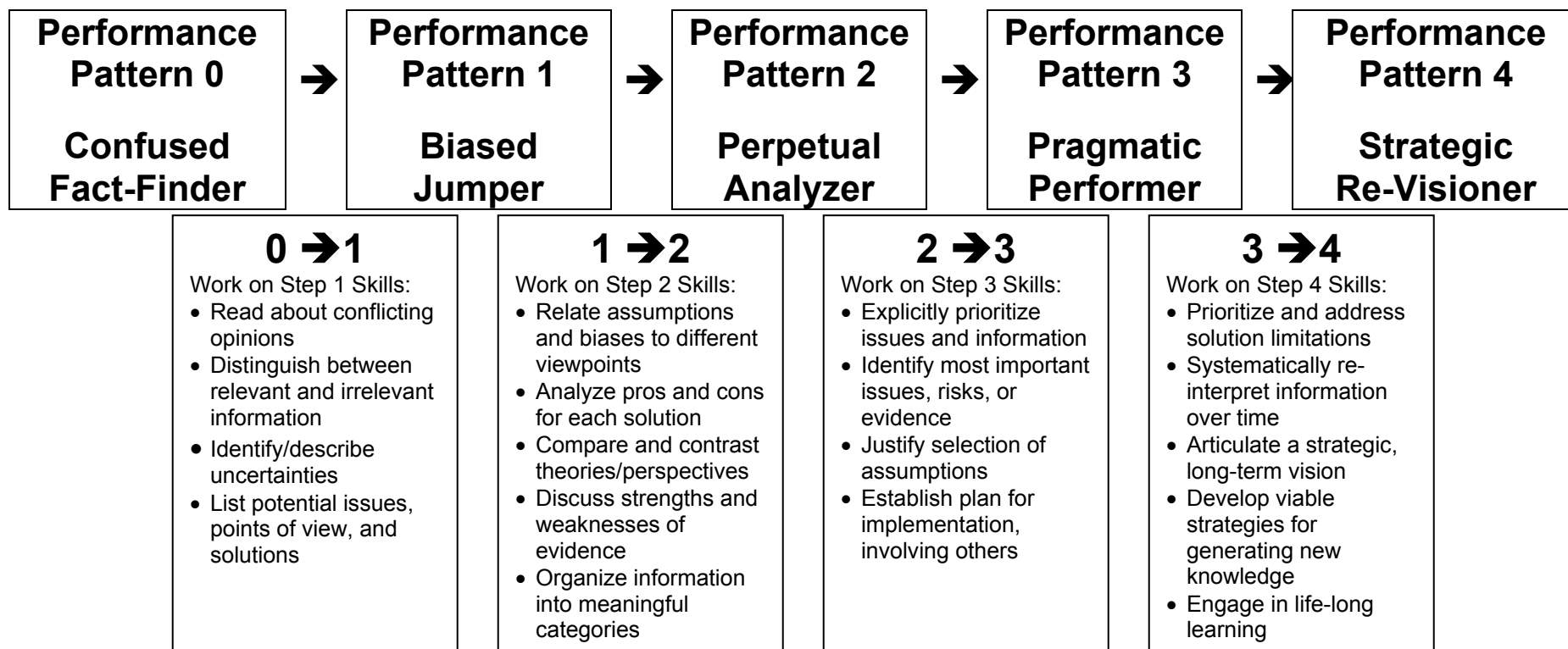
Most professors expect too much too soon; Keep in mind that development takes much time and practice

Provide explicit guidance and support to help students develop new skills. For example:

Use Steps for Better Thinking to help you and students focus on critical thinking skills

Design assignments to focus on specific skills (see IDEA paper Figure 3, and Templates for Designing Assignment Questions in this handout)

Specific Learning Activities to Move Students to the Next Level of Performance



For more ideas, see *Templates for Designing Assignment Questions* on the next page

Templates for Designing Assignment Questions

←Less Complex			More Complex →
Step 1—Identifying	Step 2—Exploring	Step 3—Prioritizing	Step 4—Envisioning
<p>Identifying Relevant Information:</p> <ul style="list-style-type: none"> * List data or types of information relevant to _____ * Identify relevant information in _____ (a textual passage such as a case, article, piece of literature, etc.) * Access relevant standards or rules for _____ * Identify factors related to _____ * Identify various potential solutions to _____ * Describe arguments in favor of _____ <p>Identifying Uncertainties:</p> <ul style="list-style-type: none"> * Explain why _____ cannot completely eliminate risk of _____ * Describe uncertainties concerning _____ * Identify and describe uncertainties about the interpretation or significance of _____ * Identify risks associated with _____ * Describe why there is no single, “correct” way to _____ * Identify reasons why _____ might change or vary 	<p>Interpreting Information From Multiple Viewpoints:</p> <ul style="list-style-type: none"> * Describe the pros and cons of _____ * Analyze the costs and benefits of _____ * Explain how ambiguities affect your analysis of _____ * Identify assumptions associated with _____ (a point of view or alternative) * Interpret _____ from the viewpoint of _____ * Appropriately use _____ (a technique) to analyze _____ * Objectively evaluate _____ information * Explain how alternative solutions might affect _____ (one or more stakeholders) * Analyze the quality of information and evidence related to _____ * Identify own biases and explain how those biases were controlled when _____ * Identify the effects of _____ on _____ <p>Organizing Information:</p> <ul style="list-style-type: none"> * Develop meaningful categories for analyzing information about _____ * Organize the various aspects of _____ to assist in decision making 	<p>Prioritizing and Concluding:</p> <ul style="list-style-type: none"> * Develop and use reasonable guidelines for drawing conclusions regarding _____ * Assess the degree of risk of _____ * Objectively consider _____ when making a decision about _____ * Prioritize _____ * Consider _____ in reaching a conclusion * Develop reasonable recommendation for _____ * Address the costs and benefits of _____ in reaching a conclusion about _____ * Develop reasonable policies for _____ * Develop an effective plan for addressing _____ <p>Effectively Involving Others in Implementation:</p> <ul style="list-style-type: none"> * Take actions to implement the best solution to _____ * Organize _____ (a communication) so that it is meaningful to the receiving party * Communicate _____ effectively for _____ (a given setting and audience) 	<p>Acknowledging Limitations:</p> <ul style="list-style-type: none"> * Identify and describe potential future developments in _____ * Describe limitations to a recommendation about _____ * Strategically consider contingencies and future developments related to _____ <p>Creating and Monitoring Strategies</p> <ul style="list-style-type: none"> * Develop and monitor strategies for _____ * Implement appropriate corrective action for _____ over time * Acknowledge changing circumstances and reconsider _____ (a solution) as appropriate * Continuously monitor and update _____, as needed * Develop strategic uses of _____ * Manage _____ under changing or unusual demands * Apply continuous improvement principles to _____

Examples of Open-Ended Problems and Potential Questions

Topic and Potential Scenario Given to Students	Examples of Open-Ended Questions Addressing Different Aspects of Steps for Better Thinking			
	Step 1	Step 2	Step 3	Step 4
<p>Accounting for Bad Debts: Give students a scenario in which a company uses credit reports and other information to make credit decisions. In the scenario, the company has experienced an unexpected increase in bad debts.</p>	<ul style="list-style-type: none"> Identify and explain possible reasons why management might not foresee an increase in bad debts. Explain why credit reports can't be used to know for sure which customers will pay and which will become bad debts. 	<ul style="list-style-type: none"> Discuss the strengths and weaknesses of using credit reports to make credit decisions. Given bad debt problems, discuss the pros and cons of extending credit to customers. 	<ul style="list-style-type: none"> Analyze the company's credit policies and practices and recommend improvements to management. 	<ul style="list-style-type: none"> Develop a plan for monitoring the performance of the company's credit policies and practices.
<p>Education—Effectiveness of the Public Schools: You are the leader of a community task force that has been asked to establish strategies for evaluating the effectiveness of the public schools in your metropolitan school district. The task force has received very different recommendations from two national experts. One focuses on the use of standardized, norm referenced test scores. The other includes a wider range of alternative indicators, such as curricular innovations, portfolios, and satisfaction ratings.</p>	<ul style="list-style-type: none"> How is it possible for two national experts to give very different recommendations for evaluating public school effectiveness? Identify resources that will help you evaluate the two recommendations. 	<ul style="list-style-type: none"> What are the pros and cons for each recommendation? Who are the various stakeholders for the work of the task force? For each stakeholder group, discuss whether the group is likely to have a preference for one of the two recommendations. 	<ul style="list-style-type: none"> Develop a plan for the work to be performed by the task force. Explain the reasons for the design of your plan. Which expert recommendation do you think is better? How did you prioritize issues in arriving at your conclusion? 	<ul style="list-style-type: none"> Assume that the school district adopts the recommendations of the expert you consider to be better. Explain how the school district could use the evaluation results over time to improve educational effectiveness.

Examples (continued)

Topic and Potential Scenario Given to Students	Examples of Open-Ended Questions Addressing Different Aspects of Steps for Better Thinking			
	Step 1	Step 2	Step 3	Step 4
<p>Military Law You have just arrived at your first duty station at Grand Forks AFB, ND. You are the missile maintenance squadron section commander. This is your first duty day and while MSgt Big, your first sergeant, is showing you around TSgt Small approaches and says "Sir/Ma'am it's SSgt Loser again. He was 30 minutes late for work this morning and his uniform looks like he slept in it." MSgt Big tells TSgt Small, SSgt Loser's supervisor, to have SSgt Loser report to your office in 10 minutes. Welcome to North Dakota!</p> <p>You meet with SSgt Loser who tells you that he overslept. He also explains that his wife just left him and she did all his laundry and ironed his uniforms. You dismiss SSgt Loser and tell him to put on a proper uniform and you will deal with him later when you have more facts.</p> <p>Meanwhile, MSgt Big has told me, the Commander, about SSgt Loser. I come to your office, welcome you to North Dakota, tell you to find out what's up with SSgt Loser and give me a recommended course of action.</p> <p>SSgt Loser does not show up for work the next day and is nowhere to be found.</p> <p>Pertinent sections of the UCMJ and maximum punishment tables are appended to your textbook.</p>	<ul style="list-style-type: none"> • What are my options'? • What else do you need to know before making your recommendation and why do you need to know it? 	<ul style="list-style-type: none"> • Do you have any personal beliefs or assumptions that may interfere with your ability to make an objective recommendation? If so, what are they and how did you overcome them? • What are the arguments for and against each possible recommendation'? 	<ul style="list-style-type: none"> • What is your recommendation? What is the basis for your recommendation? How did you decide between the various options available to you? 	<ul style="list-style-type: none"> • What are the limitations of your recommendation? Is it possible to minimize the effects of those limitations?

Examples (continued)

Topic and Potential Scenario Given to Students	Examples of Open-Ended Questions Addressing Different Aspects of Steps for Better Thinking			
	Step 1	Step 2	Step 3	Step 4
<p>Health Care—Elderly Patient Tiny Miss Ruth sat hunched without words in her wheelchair, living the final stages of Alzheimer’s-like dementia. Her 91-year-old hands slid over the beautiful but slick cover of Birds and Blooms magazine. Birds, gardening, and reading had always been her interests. Now she couldn’t read or talk about her favorite topics; she couldn’t even hold the magazine. This frustrated and angered her! She flailed and she hummed, communicating her agitation. Quietly and with a very heavy heart, I watched, saying little but thinking much. “What might I do to improve her quality of life?”</p>	<ul style="list-style-type: none"> • What have you observed about Miss Ruth and her situation? • What is currently being done to care for Miss Ruth? • What does current literature say about caring for people like Miss Ruth? • What theories and evidence are available? • Do different facilities provide different kinds of care for people like Miss Ruth? If so, why don’t they all provide the same kind of care? • Who has input into the care Miss Ruth receives? • Why might these people view her needs and care differently? • What factors might you need to consider as you explore this problem? 	<ul style="list-style-type: none"> • What biases and assumptions might affect how you view this situation, and how might you compensate for your biases? • Evaluate evidence from the literature and from your observations of Miss Ruth’s situation from a variety of perspectives, including a traditional maintenance model of care, a restorative model of care, the perspective of her family members, the nursing home administrator, nursing director, and social worker. • What are the similarities/differences across the different perspectives about how to care for Miss Ruth? • How might you organize your analyses to help you reach a conclusion about the best way to care for Miss Ruth? 	<ul style="list-style-type: none"> • What priorities have you given to different factors that must be considered in deciding how to care for Miss Ruth? • Why do you believe those priorities are most appropriate? • Given those priorities, what do you recommend regarding Miss Ruth’s care? • How will you present your ideas to those who are interested in her care? • How might you deal with people’s different assumptions and biases if you were part of a team that would decide about Miss Ruth’s care? • Do you anticipate any disagreement? If so, how will you deal with that? 	<ul style="list-style-type: none"> • As you work with Miss Ruth, what additional information do you want to gather? • Why is this information important? • How can you go about getting that information in a systematic fashion? • What might cause you to reconsider Miss Ruth’s care plan?

Examples (continued)

Topic and Potential Scenario Given to Students	Examples of Open-Ended Questions Addressing Different Aspects of Steps for Better Thinking			
	Step 1	Step 2	Step 3	Step 4
<p>Hong Kong Dollar—Introduction to Business Course Read the following two articles:</p> <ul style="list-style-type: none"> • “Deutsche Bk Calls For 20% HK Dlr Devaluation, Then Float,” by Liz Rudall and Raymond Tsoi, Dow Jones Newswires, January 30, 2003. • “What’s in a Peg?” The Economist, October 31, 2002. 	<ul style="list-style-type: none"> • Identify and discuss uncertainties about whether the HK dollar should be delinked. 	<ul style="list-style-type: none"> • Discuss pros and cons of delinking the HK dollar. 	<ul style="list-style-type: none"> • Explain what was most important in reaching your conclusion about whether the HK dollar should be delinked. 	<ul style="list-style-type: none"> • Discuss whether it would be possible for you to change your mind about this question in the future.
<p>Ethics In two of his classes, Larry’s professors said that he could work homework problems with other students as long as he turned in his own answers. In another class the professor said that students could not work with other students. Each time the professor collected homework, students were required to write a statement at the bottom of their assignment that assured the professor that the homework had been the student’s own effort.</p> <p>Half an hour before class, Larry’s girlfriend Annie asked if Larry would help her finish the last three homework problems so she could hand them in on time. Larry asked her how she would feel about signing the statement if he helped her.</p>	<ul style="list-style-type: none"> • What is the ethical issue here? • What alternatives are available to Larry? • If the professor discovers that Annie and Larry’s answers are similar in ways that reflect the fact that they worked together, what might happen? What risks are involved? • What information is relevant to Larry’s decision? • Does this problem have a single correct solution? Why or why not? 	<ul style="list-style-type: none"> • Explore this problem from different perspectives: <ol style="list-style-type: none"> 1. Annie 2. Larry 3. The professor 	<ul style="list-style-type: none"> • How important is it for students to behave ethically? 	<ul style="list-style-type: none"> • By exploring the ethics of this situation, what could Larry and Annie learn about professional ethics?

Examples (continued)

Topic and Potential Scenario Given to Students	Examples of Open-Ended Questions Addressing Different Aspects of Steps for Better Thinking			
	Step 1	Step 2	Step 3	Step 4
<p>Self-Made Man—History course Background: During the late nineteenth-century, the United States experienced tremendous economic growth in its manufacturing sector. This occurrence was both the cause and result of large-scale immigration from Europe and the emergence of the modern corporation which came to dominate the business community. For a few, vast fortunes were being made. For some, there was a rise to middle-class prosperity. For many, life was a struggle near or in economic poverty.</p> <p>Given this background, this became the question: How did one account for the great inequalities of wealth? What was the explanation for why some people prospered so greatly while others struggled? For some the answer was given in a set of ideas collectively known as the "self-made man" theory, (also commonly known as the theory of "rugged individualism.")</p>	<ul style="list-style-type: none"> In one paragraph, explain why there are uncertainties about whether theories such as the "self-made man" theory provide good descriptions of historical events. 	<ul style="list-style-type: none"> In two-to-three paragraphs discuss the validity of the "self-made man" theory by noting both the praise and the criticism made of it. In one page, discuss how your own personal work history (or someone in your family) relates to the principles of the "self-made man" theory. Do you find the theory to be accurate or not? Why? 	<ul style="list-style-type: none"> In one page, cite the principles of the "self-made man" theory which are the most or least valid. Explain. 	

Resources for Learning More

Separate handout material for this workshop:

Lynch, C. L., & Wolcott, S. K. (2001). *Helping your students develop critical thinking skills* (IDEA Paper #37). Manhattan, KS: The IDEA Center. Available at http://www.idea.ksu.edu/papers/pdf/Idea_Paper_37.pdf

See References Cited in Above Paper. Additional References:

Wolcott, S. K. and C. L. Lynch. 2002. *Developing Critical Thinking Skills: The Key to Professional Competencies*. A tool kit. Sarasota, FL, American Accounting Association. The handbook contained in this tool kit provides detailed guidance for using Steps for Better Thinking in accounting education. Although it is designed for accounting education, the guidance can easily be adapted to other disciplines. Includes numerous assessment and assignment examples.

WolcottLynch Associates. 2003. *Educator Resources, Conference Handouts, and Working Papers* [On-line]. Available: <http://www.WolcottLynch.com>.

WolcottLynch Associates. 2003. Guidance documents prepared for the American Institute of Certified Public Accountants (AICPA) Core Competency Framework Educational Competency Assessment Web Site. New York: AICPA. Although these documents are oriented toward accounting competencies, the guidance can easily be adapted to other disciplines. Contact Susan Wolcott for copies of files in which you are interested: swolcott@WolcottLynch.com.

- *Competency Levels* (Describes competency levels as defined in Steps for Better Thinking and explains their importance for student development of desired competencies)
- *Designing Your Own Competency Elements*
- *Establishing Desired Learning Outcomes*
- *Achieving Competencies in a Program*
- *Coursework Design for Competencies*
- *Focus of Learning Techniques*
- *Competency Assessment Methods*
- *Introduction to Performance Assessment*
- *Advanced Performance Assessment* (Illustrates use of Steps for Better Thinking Skill Patterns and Steps for Better Thinking Rubric to assess student competencies)
- *Assessment Context, Validity, and Reliability*

Next Steps

Activity:

List ideas from this workshop that you could implement:

Review the above list and select ONE idea that you could implement right away.